Geometry Notes

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MATH

Similar triangles

In this lesson we'll look at the ratios of similar triangles to find out missing information about similar triangle pairs.

Similar triangles

In a pair of similar triangles, corresponding sides are proportional and all three angles are congruent. This means if you know two triangles are similar to one another you can use the information to solve for missing parts.

Corresponding angles

In a pair of similar triangles the corresponding angles are the angles with the same measure. In the diagram of similar triangles, the corresponding angles are the same color.

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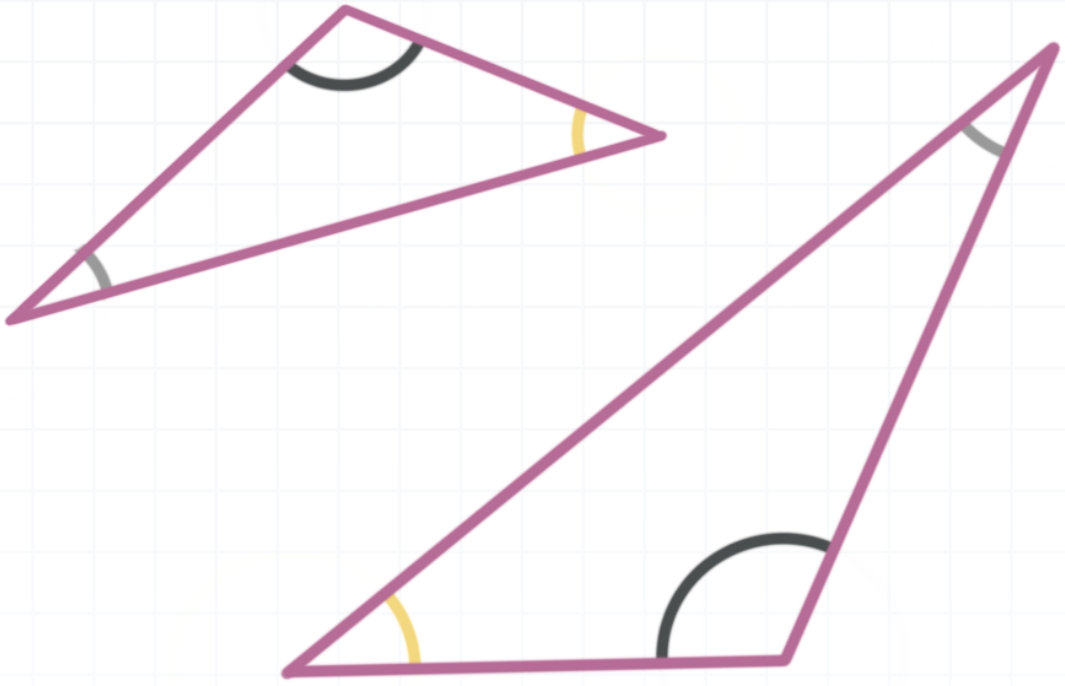
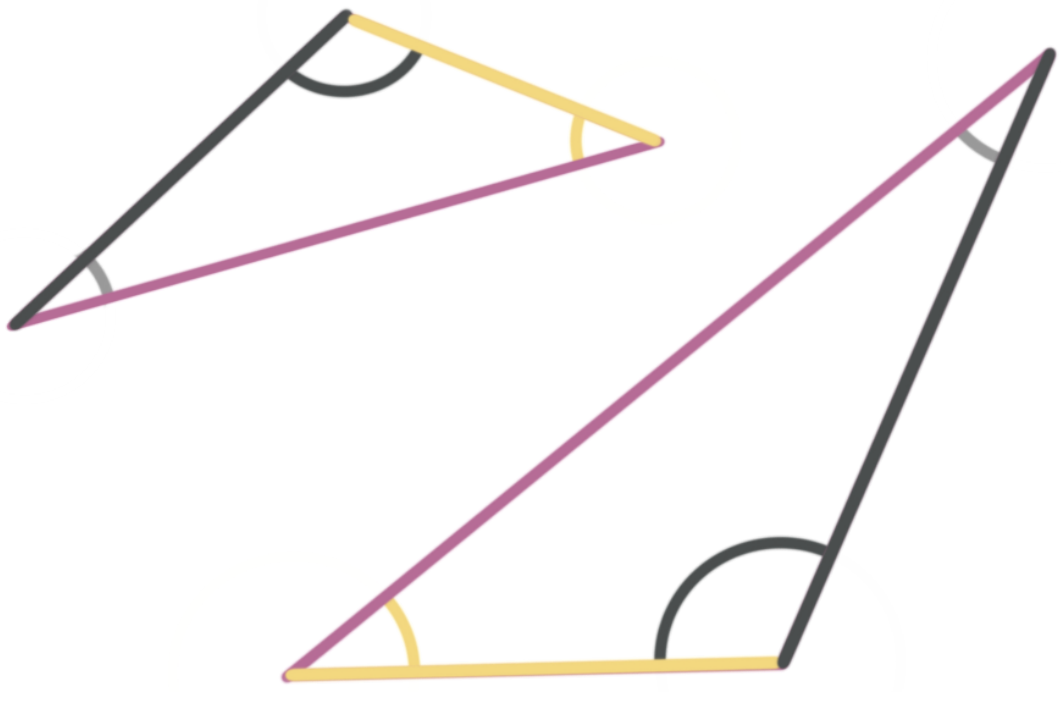


Corresponding sides

In a pair of similar triangles, the corresponding sides are proportional. Corresponding sides touch the same two angle pairs.

When the sides are corresponding it means to go from one triangle to another you can multiply each side by the same number.



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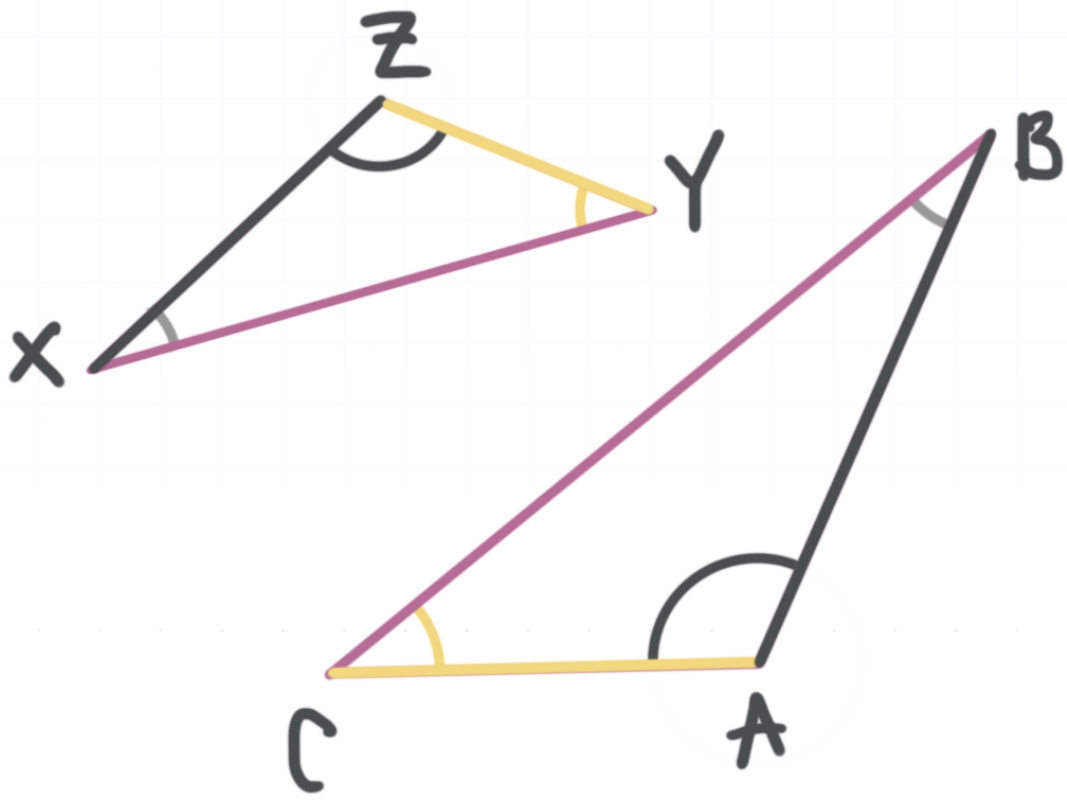
In the diagram of similar triangles the corresponding sides are the same color.

Naming similar triangles

To show two triangles are similar, you use the symbol ~. You need to match the letters from the first triangle to the angles with the corresponding vertices on the second triangle.



Here we can say that $\triangle XYZ \sim \triangle BCA$.

Let's start by working through an example.

Example

If the two triangles in the diagram are similar, solve for the variable.

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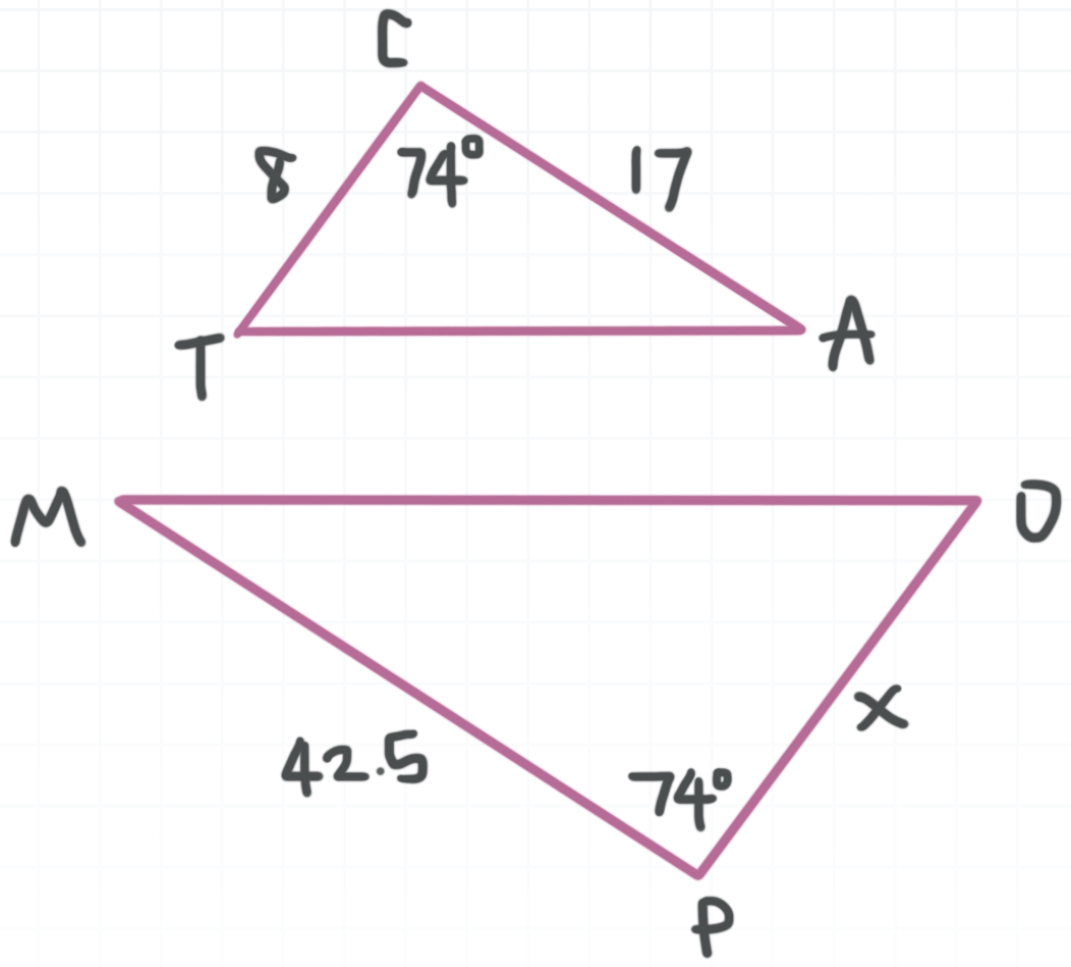

In similar triangles, corresponding sides are proportional. In the diagram, x corresponds to 8, and 42.5 corresponds to 17. So we say

$$\frac{x}{8} = \frac{42.5}{17}$$

$$17x = 8(42.5)$$

$$17x = 340$$

$$x = 20$$

Let's try one more.

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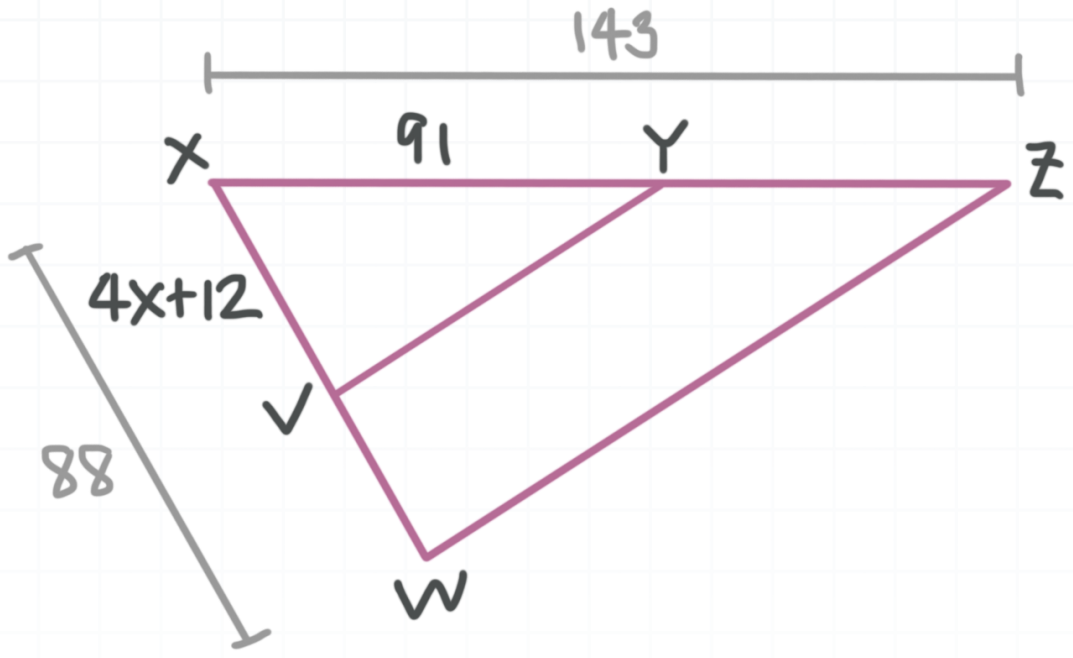
Example

If $\triangle XVY \sim \triangle XWZ$, solve for x.



In similar triangles, corresponding sides are proportional. In the diagram, $4x + 12$ corresponds to 88, and 91 corresponds to 143.

$$\frac{4x + 12}{88} = \frac{91}{143}$$

$$(4x + 12)143 = 91(88)$$

$$(4x + 12)143 = 8{,}008$$

$$\frac{(4x + 12)143}{143} = \frac{8{,}008}{143}$$

$$4x + 12 = 56$$

$$4x = 44$$

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$x = 11$

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